Tesla Cavity Conditioning

Peak power driver

Wed, Nov 16, 1994

Coupler cavity testing requires conditioning, which is careful control of the applied rf power level to the cavity, backing off when rf system trips occur. The main idea is to advance the peak power demand voltage from an initial value to a maximum value, using an initial short rf pulse length. When the target demand voltage is reached, the pulse length is slowly increased until a maximum value. When a trip occurs, reduce the power level by a fraction toward the minimum value, and also reduce the pulse length by a fraction toward its minimum short value. As conditioning improves, the rate of rise of the peak power demand voltage as well as the rate of rise of the pulse width can be adjusted to more quickly respond to a trip.

Parameters needed:	*PROMPTS*
0. Enable Bit# for this closed loop activity	`ENABLE B`
1. Other parameters:	`OTHER C`
Minimum peak power demand voltage	
Maximum peak power demand voltage	
Power demand adjustment per time interval	
Time interval in cycles for power adjustment	
Minimum pulse width	
Maximum pulse width	
Pulse width adjustment per time interval	
Peak power demand restart % after trip	
Pulse width restart % after trip	
2. rf 'on' status Bit#, state	`RF ON B`
3. rf system reset control Bit#	`RESET B`
4. Peak power demand voltage Chan#	`PPOWER C`
5. Pulse width Chan#	`PWIDTH C`
6–9. (spare)	

Backoff logic

The minimum and maximum values for the power demand specify the range of values to be used during conditioning, beginning with the value of power demand when the local application is first enabled. The same is true for the pulse width minimum and maximum values. In other words, starting the application does not cause the power demand and pulse width to be reset to their minimum values. But when a trip occurs, both the power demand and the pulse width will be reduced by a fraction toward their minimum range values. For example, if the power demand range were 1–6 volts, the pulse width range were 100–1000 μ s, the restart fractions for both were 50%, the current power demand was 5 volts, and the current pulse width were 500 μ s. If a trip occurs, then the power demand will be reduced to 4 volts, and the pulse width would be reduced to 300 μ s. If another trip occurred right away, the power demand would be further reduced to 2.5 volts, and the pulse width to 200 μ s. Contin

uing frequent trips would drive both parameters toward their minimum values.